How do Community Hospitals respond to the healthcare needs of elderly patients? A population-based observational study in the Emilia-Romagna Region

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Abstract

Background. Intermediate Care Services have been developed to provide high-quality and sustainable care to the elderly patients with chronic diseases. Italian Community Hospitals, inspired by the British model, are an example of Intermediate Care. The aim of this study was: (1) to describe the healthcare needs met by the Community Hospitals of Emilia-Romagna, Northern Italy, by depicting the characteristics of hospitalized patients, and (2) to evaluate process and outcome indicators by conducting a comparative assessment of the quality of care.

Study design. Observational retrospective cohort study.

Methods. The study population included patients living in Emilia-Romagna who were discharged during 2016 from the 14 Community Hospitals of the region. Data were retrieved from the Regional Informative System of Community Hospitals database; multi-morbidity profiles were identified through the Hospital Discharge Records Database and the Outpatient Pharmaceutical Database. In-hospital variation of the 5-level Modified Barthel Index and hospital readmissions within 3 months of discharge were retrieved for each patient. The presence of recurrent patterns of multi-morbidity, i.e., clinical conditions that tend to co-occur, was investigated using unsupervised cluster analysis.

Results. The study population included 2,121 patients. Mean age was 79.5 years, mean Community Hospital stay was 22.4 days (range 13.1 - 31.5 days) and 62.5% of the patients were females. The most common sources of admission were hospital (71.8%) and home (27.0%). Routine discharges were 60.0%, planned home discharges were 13.6%, and transfers to public or private hospitals were 10.8%.

We identified two multi-morbidity clusters unevenly distributed across Community Hospitals. Mean number of co-occurring chronic conditions per patient was different in the two clusters (3.0 vs. 4.7, p < 0.004). Mean Modified Barthel Index at admission and discharge was 32.2 and 47.6, respectively. Mean difference of 15.3 between values at admission and discharge was statistically significant (p < 0.001). Three-month hospital readmissions occurred for 20.2% of patients.

Conclusions. The development of Intermediate Care Services, and in particular Community Hospitals, requires guidelines and protocols to define who among the patients can benefit more from this type of care. It is necessary to assess the quality of care provided by these facilities through appropriate and internationally comparable measures, including patient experience indicators.

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Introduction

The increase in life expectancy has led to a rise in the prevalence of patients with two or more chronic diseases (multi-morbidity) (1, 2). It is estimated that more than half of those who have a chronic disease have at least another disorder (2, 3). The elderly patients with multi-morbidity are frequent users of healthcare services, both in terms of pharmacological prescriptions and hospital admissions, and have a significant impact on healthcare costs (4, 5). Traditional hospital care, based on organizational models built around single disciplines, has not always been able to respond to these complex healthcare needs and would require a more holistic approach (6). In addition, it is estimated that the inappropriate use of hospitals involves 15-50% of acute care beds (7), and that prolonged hospital stays have potentially critical consequences for patients (8).

It is thus necessary to implement well-defined discharge plans to cope with the complex needs of patients with chronic conditions (9, 10). Therefore, it is essential to ensure continuity of care by developing services that integrate hospital and primary care services, such as Intermediate Care services (11). Since the late '90s, in several European countries Intermediate Care has been developed for the management of elderly patients with chronic diseases in order to respond to their care needs and achieve greater system efficiency (12, 13). In the UK, Intermediate Care has been introduced to prevent unnecessary hospitalizations and delayed discharges, and to facilitate access to rehabilitation and patient's return to home (14, 15). A Cochrane review on the effectiveness of this care model shows that patients admitted to Intermediate Care facilities after hospitalization have fewer short-term hospital readmissions compared with those who are directly discharged to home (16).

In the UK, the National Health Service (NHS) Benchmarking Network has launched the National Audit of Intermediate Care (NAIC) for the evaluation of Intermediate Care Services, including Community Hospitals (17). The NAIC collects annual data on services, organizational models, accessibility, funding, staff-mix, and quality of care provided. The Community Hospitals Report evaluates structural features, access procedures, activities, staff equipment, costs, and quality of service through process and outcome indicators, including patient experience (17). In Italy, Intermediate Care services were first mentioned in the National Healthcare Plan 2006-2008 guidelines, and since then all regions have chosen different strategies to implement these services (18, 19). Italian Community Hospitals are based on the UK model (20) and, according to the Ministerial Decree n. 70/2015, have a limited number of beds (max 20) managed by nurses and general practitioners or specialists for patients needing care that cannot be provided at home. The expected length of stay in Community Hospitals is about 15–20 days. According to the Decree, patients can be admitted to Community Hospitals from hospital wards, emergency rooms, home, or residential care facilities for the elderly.

Although the Emilia-Romagna Region lacks specific guidelines for Community Hospitals, a Regional Decree for the accreditation of Primary Care Department (n. 221/2015) states that the elderly patients with multi-morbidity, worsening chronic diseases or rehabilitation needs can be admitted to "primary care beds". Based on these indications, beginning 2016, six Local Health Authorities of Emilia-Romagna have opened 14 Community Hospitals. Most of these Community Hospitals respond to the need to "convert" beds of small and peripheral hospitals. Because each structure has a specific organization, it is of primary interest to conduct a comparative evaluation in terms of care provided and characteristics of patients managed.

To the best of our knowledge, international studies and Italian healthcare programming documents, both national and regional, focus on the description of Intermediate Care services, but lack analyses of socio-demographic and clinical characteristics of patients whom these services should be addressed to. The aim of this study was to describe the healthcare needs met by Community Hospitals of Emilia-Romagna by depicting the characteristics of hospitalized patients, and to conduct a comparative assessment of the quality of care using process and outcome indicators. The secondary purpose of this study was to compare the Intermediate Care Service models of Italy and UK.

Methods

The study population included patients residing in Emilia-Romagna who were discharged between January 1 and December 31, 2016 from the 14 Community Hospitals of the region. To define the patient's characteristics, only the first hospitalization (index admission) was considered, while all episodes occurring during the study year were considered to define the characteristics of the hospitalization.

Data were retrieved from the Regional Informative System of Community Hospitals (RISCO) system (*Sistema Informativo Regionale Ospedali di Comunità – SIRCO*), active since January 1, 2015, according to the indications of Regional Circular n. 26 of December 22, 2014. This administrative database includes all care interventions carried out in Community Hospitals, as well as patient's personal data, source and procedures for admission, reasons for the hospitalization, interventions/procedures, and any social-familiar problems related to hospitalization and discharge.

Using the information anonymized at the Regional Statistical Office and made available on the RISCO database, the main features of care provided in Community Hospitals were assessed. Thanks to the data linkage of healthcare administrative databases using the patient unique identification code, it was possible to describe multi-morbidity profiles and hospital and Community Hospital readmissions within 90 days of discharge from index admission. For each patient, the presence of 30 diseases (20 physical and 10 mental) was detected using the Hospital Discharge Records (HDRs) database (*Scheda di Dimissione Ospedaliera – SDO*), while filled prescriptions were retrieved from the Regional Health Authority Outpatient Pharmaceutical Database (OPD), which includes drugs reimbursed by the healthcare system that are prescribed by the primary care physician or a specialist (*Assistenza Farmaceutica Territoriale – AFT*), or directly delivered by the hospital pharmacies (*Farmaci a Erogazione Diretta – FED*). Physical and mental diseases were classified by means of an algorithm used in an Italian study focusing on multi-morbidity in the adult population (3), which was partially modified and adapted to this study population, made up of very old patients. In particular, 24 clinical conditions were identified exclusively using ICD-9-CM diagnosis codes occurring over the 36 months preceding the admission to the Community Hospital. Five conditions were identified using both HDRs and OPD, assigning the disease to the patient if it was present in at least one of the two data sources, according to existing protocols - more specifically, a patient was considered suffering from hypertension or diabetes if he/she had at least 2 filled prescriptions in the previous year, while the minimum number of filled prescriptions for defining depression, anxiety and bipolar disorder was 4. The only condition retrieved exclusively from the OPD was thyroid disorders (≥2 prescriptions). (For a complete list of diseases and definitions, see supplementary files).

For comparative purposes, we considered the variation in the patient's functional autonomy between admission and discharge as the study outcome. In particular, thanks to its simplicity and validity and in keeping with the British NAIC, we used the Modified Barthel Index (MBI) in the 5-level version proposed by Shah (21). MBI is a measure of daily life activity, that shows the degree of independence of a patient. It covers 10 domains of functioning: grooming, bathing, feeding, use of toilets, climbing stairs, dressing, fecal and urinary incontinence, walking and transfers (e.g. from chair to bed). Each activity is assigned a score ranging from 0 (cannot perform tasks) to a maximum of 5, 10 or 15 (completely independent). The total score ranges from 0 to 100 and is inversely proportional to the patient degree of disability. The Regional Circular n. 16 of December 23, 2015 compelled the inclusion of MBI at both admission and discharge in the RISCO database.

For each patient, we also investigated all-cause readmissions to hospitals and Community Hospitals at 90 days of discharge. In case of a transfer to a public or private hospital following index hospitalization, the beginning of the follow-up period was set at the date of hospital discharge.

Statistical Analysis

Data were described as means ± standard deviation, percentages and graphical displays. The presence of recurrent patterns of multi-morbidity, i.e., clinical conditions that tend to co-occur, was investigated through unsupervised cluster analysis. More specifically, we adopted the Balance Iterative Reducing and Clustering using Hierarchies algorithm (22), and opted for the log-likelihood as distance measure. The number of clusters was determined using the Bayesian Information Criterion. Post hoc pairwise comparisons across the resulting clusters were analyzed using Student's *t*-test, Pearson's χ^2 test, Mann-Whitney *U* test, and Fisher's exact test. All data were analyzed using the SPSS software, version 23.

Table 1 – Age and Length of Stay of Patients admitted to Community Hospitals. Source: RISCO 2016

Local Healthcare Authority	Community Hospital	Patients	Mean Age	Age St. Dv.	Hospitalizations	Length of Stay	
						Mean	Total
Parma	#1	133	81.0	0.9	143	23.0	3292
	#2	99	81.4	1.2	113	22.3	2521
	#3	98	78.8	1.2	105	31.5	3306
	#4	114	69.3	1.0	124	13.1	1622
Reggio Emilia	#5	40	78.8	2.0	47	18.7	878
Modena	#6	225	80.0	0.7	254	17.6	4459
	#7	127	80.6	1.0	177	21.8	3854
Imola	#8	196	81.1	0.7	211	24.2	5116
Ferrara	#9	193	79.3	0.7	216	25.8	5571
	#10	215	80.5	0.6	229	27.6	6330
Romagna	#11	486	79.3	0.4	521	18.9	9824
	#12	22	76.8	3.4	26	27.5	714
	#13	99	81.0	1.0	136	28.5	3873
	#14	74	81.3	1.4	84	25.1	2108
Emilia-Romagna Region		2121	79.5	0.2	2386	22.4	53,468

Results

A total of 2,121 patients were discharged from Community Hospitals of Emilia-Romagna during the study period. Mean age was 79.5 years, mean hospital stay was 22.4 days (range 13.1 - 31.5 days) and 62.5% of patients were females. Patient characteristics, overall and by Community Hospital, are summarized in Table 1. Ninety-seven patients (4.6%) died - 78 during index hospital stay, and 19 along the following hospitalizations.

Of the 2,121 study patients, 523 (24.7%) had a single condition, while 1,598 (75.3%) had two or more. Among the clinical conditions retrieved from the HDRs, the most frequent was hypertension (82.5%), followed by depression, anxiety and dysthymia (34.1%), diabetes (23.1%), and cerebrovascular diseases (22.0%) (Table 2).

Cluster analysis carried on patients with multiple diseases produced two multi-morbidity clusters, hereafter named "A" and "B", accounting for 39.9% and 35.4% of the study population. Mean number of co-occurring chronic conditions per patient was lower in A than in B (3.0 vs. 4.7, $p = 0.004$). As shown in Table 2, patients in cluster A had a higher prevalence of mental illness (48.2%), diabetes (30.8%), thyroid disease (20.5%), and cerebrovascular disease (20.1%); on the contrary, cluster B exhibited a higher frequency of cardiac arrhythmias (46.7%), congestive heart failure (42.7%), renal failure (22.1%), and chronic pulmonary disease (25.0%).

Table 2 – Results from Cluster Analysis. Source: HDRs 2013–2016; OPD 2015–2016

| | ≤ 1 Condition | | Multi-Morbidity Patterns | | | | Total | |
| | | | Custer A | | Cluster B | | | |
	n	%	n	%	n	%	n	%
Hypertension	280	(53.5)	737	(87.0)	732	(97.5)	1749	(82.5)
Myocardial infarction	1	(0.2)	3	(0.4)	91	(12.1)	95	(4.5)
Congestive heart failure	2	(0.4)	0	(0.0)	321	(42.7)	323	(15.2)
Peripheral vascular disease	2	(0.4)	7	(0.8)	115	(15.3)	124	(5.8)
Cerebrovascular disease	6	(1.1)	170	(20.1)	291	(38.7)	467	(22.0)
Cardiac arrhythmias	1	(0.2)	7	(0.8)	351	(46.7)	359	(16.9)
Diabetes	14	(2.7)	261	(30.8)	216	(28.8)	491	(23.1)
Thyroid disease	5	(1.0)	174	(20.5)	106	(14.1)	285	(13.4)
Chronic pulmonary disease	1	(0.2)	14	(1.7)	188	(25.0)	203	(9.6)
Liver disease	1	(0.2)	26	(3.1)	15	(2.0)	42	(2.0)
Renal failure	0	(0.0)	27	(3.2)	166	(22.1)	193	(9.1)
Rheumatic disease	1	(0.2)	1	(0.1)	33	(4.4)	35	(1.7)
Peptic ulcer	0	(0.0)	12	(1.4)	7	(0.9)	19	(0.9)
Tumors	16	(3.1)	143	(16.9)	58	(7.7)	217	(10.2)
Orthopedic and rehabilitation conditions	5	(1.0)	125	(14.8)	152	(20.2)	282	(13.3)
Substance abuse	0	(0.0)	18	(2.1)	9	(1.2)	27	(1.3)
Dementia	5	(1.0)	101	(11.9)	182	(24.2)	288	(13.6)
Mild to moderate mental illness	33	(6.3)	408	(48.2)	283	(37.7)	724	(34.1)
Severe mental illness	1	(0.2)	41	(4.8)	14	(1.9)	56	(2.6)
Other mental illness	1	(0.2)	7	(0.8)	5	(0.7)	13	(0.6)
Neurological disorders	8	(1.5)	76	(9.0)	78	(10.4)	162	(7.6)
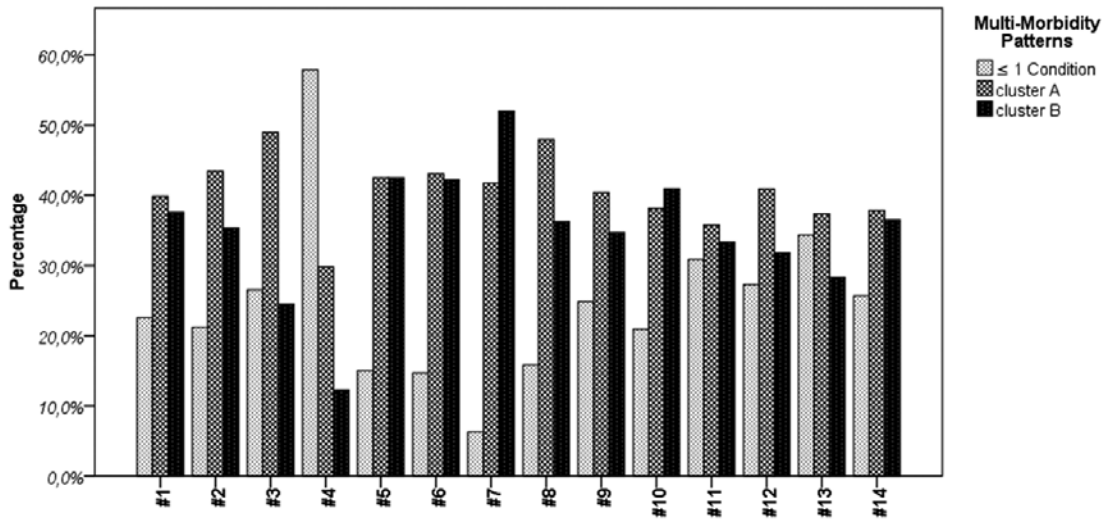
Figure 1 – Clusters A and B by Community Hospital

Clusters A and B were not evenly distributed across Community Hospitals, as illustrated in Figure 1. Prevalence of A ranged from 29.8% to 49.0%, while prevalence of B range from 12.3% to 52.0%.

Mean age for A and B was 79.0 and 82.1 years, respectively ($p < 0.001$). Also gender composition was significantly different ($p = 0.002$) in the two clusters: females were 66.2% in A and 58.9% in B.

Overall, we found 2,386 admissions to Community Hospitals for 2,121 patients.

As shown in Table 3, most of these (71.8%) occurred after discharge from public or accredited private hospitals (in Emilia-Romagna, as in the other Regions, there are private hospitals that supply some services for the regional healthcare system after accreditation and are paid by public funding). Reasons for accessing Community Hospitals were: surveillance and nursing care (40.7%), rehabilitation care (37.7%), patient or caregiver education (12.0%), minor acute or chronic illness (5.5%), and other (4.1%).
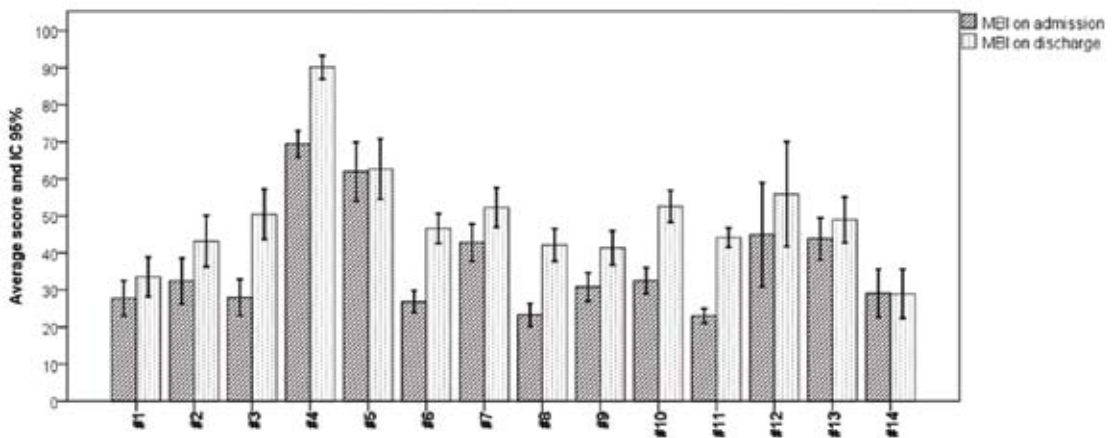

Figure 2 – Modified Barthel Index Score on Admission and Discharge, by Community Hospital

Table 3 – Source of Admission and Destination at Discharge. Source: RISCO 2016

Local Healthcare Authority	CH	Source of Admission						Destination at Discharge											
		Home		Public/Private Hospital		Other Facility		Died		Routine Discharge		Transfer to Public/Private Hospital		Planned Home Discharge		Planned Discharge to Other Facility		Left Against Medical Advice	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Parma	#1	36	(25.2%)	100	(69.9%)	7	(4.9%)	36	(25.2%)	66	(46.2%)	10	(7.0%)	3	(2.1%)	26	(18.2%)	2	(1.4%)
	#2	56	(49.6%)	53	(46.9%)	4	(3.5%)	5	(4.4%)	61	(54.0%)	24	(21.2%)	7	(6.2%)	16	(14.2%)	0	(0.0%)
	#3	3	(2.9%)	101	(96.2%)	1	(1.0%)	1	(1.0%)	56	(53.3%)	18	(17.1%)	12	(11.4%)	18	(17.1%)	0	(0.0%)
	#4	36	(29.0%)	88	(71.0%)	0	(0.0%)	0	(0.0%)	115	(92.7%)	5	(4.0%)	2	(1.6%)	0	(0.0%)	2	(1.6%)
Reggio Emilia	#5	34	(72.3%)	12	(25.5%)	1	(2.1%)	3	(6.4%)	9	(19.1%)	9	(19.1%)	20	(42.6%)	6	(12.8%)	0	(0.0%)
Modena	#6	29	(11.4%)	224	(88.2%)	1	(0.4%)	5	(2.0%)	196	(77.2%)	28	(11.0%)	13	(5.1%)	11	(4.3%)	1	(0.4%)
	#7	72	(40.7%)	98	(55.4%)	7	(4.0%)	7	(4.0%)	94	(53.1%)	29	(16.4%)	22	(12.4%)	21	(11.9%)	4	(2.3%)
Imola	#8	3	(1.4%)	208	(98.6%)	0	(0.0%)	11	(5.2%)	82	(38.9%)	26	(12.3%)	84	(39.8%)	8	(3.8%)	0	(0.0%)
Ferrara	#9	89	(41.2%)	126	(58.3%)	1	(0.5%)	4	(1.9%)	103	(47.7%)	22	(10.2%)	49	(22.7%)	36	(16.7%)	2	(0.9%)
	#10	92	(40.2%)	137	(59.8%)	0	(0.0%)	2	(0.9%)	129	(56.3%)	31	(13.5%)	41	(17.9%)	22	(9.6%)	4	(1.7%)
Romagna	#11	36	(6.9%)	482	(92.5%)	3	(0.6%)	8	(1.5%)	373	(71.6%)	45	(8.6%)	49	(9.4%)	44	(8.4%)	2	(0.4%)
	#12	13	(50.0%)	13	(50.0%)	0	(0.0%)	1	(3.8%)	15	(57.7%)	1	(3.8%)	5	(19.2%)	1	(3.8%)	3	(11.5%)
	#13	64	(47.1%)	70	(51.5%)	2	(1.5%)	10	(7.4%)	78	(57.4%)	6	(4.4%)	0	(0.0%)	41	(30.1%)	1	(0.7%)
	#14	82	(97.6%)	1	(1.2%)	1	(1.2%)	4	(4.8%)	54	(64.3%)	4	(4.8%)	18	(21.4%)	2	(2.4%)	2	(2.4%)
Emilia-Romagna Region		**645**	**(27.0%)**	**1713**	**(71.8%)**	**28**	**(1.2%)**	**97**	**(4.1%)**	**1431**	**(60.0%)**	**258**	**(10.8%)**	**325**	**(13.6%)**	**252**	**(10.6%)**	**23**	**(1.0%)**

Note: Sources of admission to Community Hospitals were classified into three categories: home, hospital (either public or accredited private), and other facility (hospice, residential/intermediate care facility). Destinations at discharge were classified into six categories: died, routine discharge, transfer to either public or private hospital, planned hospital discharge, planned discharge to other facility (hospice, residential/intermediate care facility), left against medical advice.

Mean MBI at admission was 32.2, ranging from 23.0 in the Local Healthcare Authority (LHA) of Romagna to 69.4 in the LHA of Parma; MBI at discharge was 47.6, ranging from 29.0 in the LHA of Romagna to 90.1 in the LHA of Parma. Mean difference of 15.3 between values at admission and discharge was statistically significant ($p < 0.001$). Figure 2 illustrates MBI values for each of the 14 Community Hospital.

As shown in Table 3, routine discharges were 60.0%, planned home discharges were 13.6%, transfers to public or private hospitals were 10.8%, and planned discharges to residential care facilities were 10.6%.

Of the 2,043 patients discharged alive from Community Hospitals, 20.2% experienced at least one hospital readmission at 90 days. Of the 1,600 patients discharged to home, 18.1% were readmitted to hospital at 90 days (9.1% at 30 days). Of the 222 patients transferred to hospital after index hospitalization, 29.7% were newly admitted to hospital (18.9% at 30 days). Of the 221 patients discharged to residential care facilities, 25.8% and 20.4% were readmitted to hospital at 90 days and 30 days, respectively (Table 4).

Of the 2,043 patients discharged alive from Community Hospitals, 8.8% experienced at least one Community Hospital readmission at 90 days. Of the 1,600 patients discharged to home, 5.3% were readmitted to Community Hospitals at 90 days. Of the 222 patients transferred to hospital after index hospitalization, 34.7% were newly admitted to Community Hospitals. Of the 221 patients discharged to residential care facilities, 8.1% were readmitted to Community Hospitals at 90 days. (Data not shown in tables.)

Discussion and conclusions

Community Hospitals represent a possible model of Intermediate Care in Italy, but there is still a lack of monitoring and assessment processes aimed at evaluating the characteristics of patients and the effectiveness of care.

For the first time in Italy, the present study describes the characteristics of patients admitted to Community Hospitals. These subjects were very old and predominantly (75.3%) affected by two or more chronic conditions. This figure is consistent with the range of prevalence values found in other studies on multi-morbidity, and is close to the upper boundary of this range (95.1%) (23, 24). However, a recent study conducted in Emilia-Romagna found a prevalence of multi-morbidity lower than our result, i.e., 49.9% for 80- to 84-year-olds (3). By the way, it is difficult to compare our findings with those present in the literature because population, setting, data source and pathologies included are heterogeneous.

Despite similarities and differences with results from other studies, our findings suggest that elderly patients hospitalized in Community Hospitals are particularly complex and need a structured and appropriate care supply. In particular, we found two multi-morbidity clusters made up of pathologies that other studies have found to be significantly correlated (23, 25-27). One-third of the study population had a multi-morbidity profile (cluster B) that includes heart failure, arrhythmias and conduction disorders, kidney disease, and chronic lung disease—all diseases whose association can be explained by shared pathophysiological pathways (23-24, 27-29). The clinical picture of these patients might represent an aggravation of basic clinical conditions, since typical pathologies of multi-organ dysfunction were present. The prevalence of patients with multiple organ failure varied across Community Hospitals, suggesting that patient access depended on different organizational factors rather than different patterns of diseases. Some Community Hospitals indeed admit

Table 4 – Thirty-Day and Three-Month Hospital Readmissions by Type of Destination at Discharge from Community Hospitals. Source: RISCO 2016, HDR January 2016 – March 2017

Local Healthcare Authority	Community Hospital	Home Discharge					Transfer to Hospital					Transfer to Other Facility				
		All	≤ 30 days n	%	≤ 90 days n	%	All	≤ 30 days n	%	≤ 90 days n	%	All	≤ 30 days n	%	≤ 90 days n	%
Parma	#1	68	4	(5.9)	9	(13.2)	9	1	(11.1)	4	(44.4)	24	2	(8.3)	2	(8.3)
	#2	63	7	(11.1)	16	(25.4)	18	4	(22.2)	5	(27.8)	14	1	(7.1)	3	(21.4)
	#3	63	2	(3.2)	4	(6.3)	17	4	(23.5)	6	(35.3)	18	3	(16.7)	4	(22.2)
	#4	110	1	(0.9)	5	(4.5)	4	1	(25.0)	1	(25.0)	0	0	(0.0)	0	(0.0)
Reggio Emilia	#5	25	7	(28.0)	10	(40.0)	7	3	(42.9)	4	(57.1)	5	0	(0.0)	0	(0.0)
Modena	#6	188	26	(13.8)	47	(25.0)	25	2	(8.0)	8	(32.0)	8	2	(25.0)	5	(62.5)
	#7	88	8	(9.1)	17	(19.3)	20	3	(15.0)	4	(20.0)	16	1	(6.2)	4	(25.0)
Imola	#8	155	21	(13.5)	40	(25.8)	23	4	(17.4)	5	(21.7)	8	0	(0.0)	0	(0.0)
Ferrara	#9	138	21	(15.2)	33	(23.9)	18	4	(22.2)	7	(38.9)	34	6	(17.6)	7	(20.6)
	#10	164	13	(7.9)	27	(16.5)	29	12	(41.4)	14	(48.3)	20	1	(5.0)	2	(10.0)
Romagna	#11	395	31	(7.8)	66	(16.7)	41	4	(9.8)	8	(19.5)	42	10	(23.8)	10	(23.8)
	#12	19	0	(0.0)	0	(0.0)	1	0	(0.0)	0	(0.0)	1	0	(0.0)	0	(0.0)
	#13	59	2	(3.4)	4	(6.8)	6	0	(0.0)	0	(0.0)	29	19	(65.5)	20	(69.0)
	#14	65	3	(4.6)	11	(16.9)	4	0	(0.0)	0	(0.0)	2	0	(0.0)	0	(0.0)
Emilia-Romagna Region		1600	146	(9.1)	289	(18.1)	222	42	(18.9)	66	(29.7)	221	45	(20.4)	57	(25.8)

Note: Destinations at discharge from Community Hospitals were classified into three categories: home discharge (routine discharge, planned home discharge, left against medical advice), transfer to hospital (either public or private), and transfer to other facility (hospice, residential/intermediate care facility). Patients died during index hospitalization were excluded.

patients mainly from acute hospitals, while others admit patients mainly from home; also, in some cases, admission is proposed by general practitioners, and in others by general practitioners and specialists in geriatrics or in clinical medicine belonging to the NHS. These differences are likely the result of how Community Hospitals were settled in each specific area. Some of them were born from the conversion of peripheral hospital facilities, and some others from the necessity to enhance residential services. This may suggest that, in Emilia-Romagna, Community Hospitals are mostly used to favor hospital discharges and not as an alternative to hospitalization for patients coming from home or long-term residencies and needing stabilization or health surveillance.

We found a 90-days readmission rate of 20.2%. This result is particularly relevant, as the majority of patients admitted to Community Hospitals came from the traditional hospital. Comparing our data with those from the NAIC 2015 and the Community Hospital 2016 Report, some differences emerge. Mean age of patients assisted in Intermediate Care Services was higher in UK than in Emilia-Romagna (83 vs. 79.5 years), as well as mean length of stay (22.4 vs. 28 days). Sources of admission also differed: in Emilia-Romagna 71.8% of patients came from acute hospitals and 27.0% from home, while in UK 51.8% came from the hospital and 40.1% from home. MBI at admission was, on average, lower in Emilia-Romagna than in UK patients (32.2 vs. 57.3), as well as its in-hospital variation (15.3 vs. 19.1); however, when reading this result one must consider that in Emilia-Romagna the MBI at admission was much lower than in UK. In-hospital deaths were 4.6% in Emilia-Romagna and 6.3% in UK. Routine discharges were more common in UK than in Emilia-Romagna (66.6 vs. 60.0%), while planned discharges to residential care facilities were more common in Emilia-

Romagna (24.2 vs. 17.1%). The rate of readmission to Community Hospitals at 30 days from discharge was higher in Emilia-Romagna (8.8%) than in UK (6.9%).

To sum up, patients hospitalized in Community Hospitals of Emilia-Romagna were of advanced age, had a higher burden of multi-morbidity when compared to the general population, and were likely to be readmitted to hospital at 90 days from discharge. In the absence of specific guidelines, each Community Hospital has developed different strategies to admit patients with different healthcare needs.

Overall, the comparison with the UK showed some differences in patients' case mix, admission source and independence, although a reliable and comprehensive comparative assessment is not possible. For historical reasons the UK Intermediate Care system is more advanced than the Italian one, and is now part of an integrated network of care. In UK, Intermediate Care system manages mainly non-complex, elderly patients; in Emilia-Romagna, patients hospitalized in Community Hospitals are as much old as in UK, but they predominantly come from acute hospitals.

A strength of this study is that, for the first time in Italy, it investigated the case mix and outcomes of patients hospitalized in Community Hospitals. This analysis was made possible thanks to the presence of a specific administrative database, which is constantly updated to improve the accuracy and quality of compilation by professionals and to select the information useful to implement an effective monitoring system. However, some variables such as the reason for hospitalization are still not reliable and were thus discarded from analyses. Despite this limitation, some suggestions and policy implications can be derived from this study. The high readmission rate suggests that it is necessary to revise the patient access criteria in relation to the context and healthcare needs of the target population, in order to facilitate

the return home in conditions of clinical stability and independence and to prevent potentially avoidable re-hospitalizations. To ensure continuity of care and implement national health policies for older patients with complex clinical profiles, Intermediate Care services should play a pivotal role in the integration of hospital and primary care settings by promoting a multidisciplinary and patient-centered approach. The development of Intermediate Care, and in particular Community Hospitals, requires guidelines and protocols to define which patients can benefit more from this type of care. It will also be necessary to assess the quality of care provided by these facilities through appropriate and internationally comparable indicators.

The Patient Reported Experience Measures (PREMs) are an important suggestion coming from the UK experience. Since 2013, a short questionnaire has been administered to patients discharged from Community Hospitals in order to detect the patient's point of view and involvement in the care planning process (30). A validation study of PREMs in the Community Hospitals of Emilia-Romagna is forthcoming (31). In a care setting where quality-of-care outcomes are not supposed to measure mortality or clinical complications, we think it is of great importance to detect the patient's point of view, and to use this information to improve and redesign patient-based healthcare services.

Riassunto

Come rispondono gli Ospedali di comunità ai bisogni assistenziali dei pazienti anziani? Uno studio osservazionale condotto nella regione Emilia-Romagna

Introduzione. Le Cure Intermedie sono state sviluppate come strumento per la gestione delle cronicità dei pazienti anziani, garantendo cure di qualità e una maggiore efficienza di sistema. In Italia, un esempio di Cure Intermedie è rappresentato dagli Ospedali di Comunità (OsCo) che si ispirano al modello dei Community Hospitals inglesi. L'obiettivo di questo studio è descrivere i bisogni di salute a cui rispondono gli OsCo della Regione Emilia-Romagna descrivendo le caratteristiche dei pazienti ricoverati e valutando indicatori di processo e di esito attraverso un'analisi comparativa della qualità dell'assistenza.

Disegno di studio. Studio osservazionale di coorte retrospettivo.

Metodi. La popolazione in studio comprende i pazienti residenti nella Regione Emilia-Romagna dimessi tra il 1° gennaio 2016 e il 31 dicembre 2016 dai 14 OsCo regionali. I dati sono stati rilevati attraverso il Sistema Informativo Regionale degli Ospedali di Comunità (SIRCO); i profili multimorbosità sono stati identificati attraverso le Schede di Dimissione Ospedaliera (SDO), le prescrizioni farmacologiche territoriali (AFT) e le erogazioni da parte delle farmacie ospedaliere (FED). Per ogni paziente è stata valutata la variazione del punteggio del Barthel Index Modificato (BIM) a cinque livelli e le riammissioni ospedaliere entro tre mesi dalla dimissione. La presenza di pattern ricorrenti di multimorbosità, cioè di condizioni cliniche che tendono a coesistere, è stata studiata utilizzando una cluster analysis non supervisionata.

Risultati. La popolazione in studio è composta da 2121 pazienti con età media di 79,5 anni, durata media di degenza in OsCo 22,4 giorni (variazione tra 13,1 e 31,4 giorni) e di cui il 62,5% sono donne. La maggior parte dei pazienti proviene da ospedali per acuti (71,8%) e dal domicilio (27,0%). Le dimissioni ordinarie a domicilio sono 60,0%, le dimissioni protette a domicilio sono il 13,6% e il 10,8% dei pazienti viene trasferito presso un ospedale pubblico o privato.

Sono stati identificati due pattern di multimorbosità distribuiti in modo disomogeneo tra gli OsCo. Il numero

medio di patologie croniche concomitanti per paziente è risultato differente nei due cluster (3,0 vs 4,7, p <0,004). Il punteggio medio BIM all'ammissione e alla dimissione è rispettivamente 32,2 e 47,6. La differenza media del punteggio (15,3) tra l'ammissione e la dimissione è statisticamente significativa (p <0,001). Le riammissioni ospedaliere nei tre mesi di follow up si sono verificate per il 20,2% dei pazienti.

Conclusioni. Lo sviluppo delle Cure Intermedie, ed in particolare degli OsCo, richiede linee guida e protocolli per definire quali pazienti possano beneficiare di più dell'assistenza erogata presso queste strutture. Occorre migliorare la valutazione della qualità dell'assistenza erogata da queste strutture attraverso misure adeguate e comparabili a livello internazionale, tra cui indicatori che valutino l'esperienza dei pazienti.

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